THAT WHICH IS CLAIMED IS:

1. A process for producing a catalyst precursor, said process consisting essentially of contacting at least one treated solid oxide compound and at least one alpha olefin;

wherein said treated solid oxide compound is produced by a process comprising: a) contacting at least one solid oxide compound with at least one electron-withdrawing anion source compound; and b) calcining said solid oxide compound before, during, or after contacting said electron-withdrawing anion source compound to produce said treated solid oxide compound.

2. A process according to claim 1 further comprising contacting said solid oxide compound with at least one metal salt compound.

3. A process according to claim 2 wherein said metal in said metal salt compound is selected from the group consisting of Groups IIA-VIIIA, IB-VIIB of the Periodic Table of Elements including lanthanides and actinides.

4. A process according to Claim 3 wherein said at least one metal is selected from the group consisting of Al, B, Be, Bi, Cd, Co, Cr, Cu, Fe, Ga, La, Mn, Mo, Ni, Sb, Si, Sn, Sr, Th, Ti, V, W, P, Y, Zn and Zr.

5. A process according to Claim 4 wherein said solid oxide compound is selected from the group consisting of Al_2O_3, B_2O_3, BeO, Bi_2O_3, CdO, Co_3O_4, Cr_2O_3, CuO, Fe_2O_3, Ga_2O_3, La_2O_3, Mn_2O_3, MoO_3, NiO, P_2O_5,

Sb_2O_5, SiO_2, SnO_2, SrO, ThO_2, TiO_2, V_2O_5, WO_3, Y_2O_3, ZnO, ZrO_2, and mixtures thereof.

6. A process for producing a catalyst precursor, said process consisting essentially of contacting a chlorided, zinc-containing alumina and propylene.

7. A catalyst precursor produced by Claim 1.

8. A catalyst precursor produced by Claim 6.

9. A catalyst precursor consisting essentially of at least one treated solid oxide compound and at least one alpha olefin;

wherein said treated solid oxide compound is produced by a process comprising: a) contacting at least one solid oxide compound with at least one electron-withdrawing anion source compound; b) optionally, also contacting said solid oxide compound with at least one metal salt compound; and c) calcining said solid oxide compound before, during, or after contacting said electron-withdrawing anion source compound or said metal salt compound to produce said treated solid oxide compound.

10. A catalyst precursor consisting essentially of a chlorided, zinc-containing alumina and propylene.

11. A process to produce a catalyst composition, said process comprising:

1) contacting said catalyst precursor of Claim 9 with at least one organometal compound and at least one organoaluminum compound;

wherein said organometal compound has the following general formula:

$$(X^1)(X^2)(X^3)(X^4)M^1$$

wherein M^1 is selected from the group consisting of titanium, zirconium, and hafnium;

wherein (X^1) and (X^2) are independently selected from the group consisting of cyclopentadienyls, indenyls, fluorenyls, substituted cyclopentadienyls, substituted indenyls, and substituted fluorenyls;

wherein substituents on said substituted cyclopentadienyls, substituted indenyls, and substituted fluorenyls of (X^1) and (X^2) are selected from the group consisting of aliphatic groups, cyclic groups, combinations of aliphatic and cyclic groups, silyl groups, alkyl halide groups, halides, organometallic groups, phosphorus groups, nitrogen groups, silicon, phosphorus, boron, germanium, and hydrogen;

wherein at least one substituent on (X^1) and (X^2) is a bridging group which connects (X^1) and (X^2);

wherein (X^3) and (X^4) are independently selected from the group consisting of halides, aliphatic groups, substituted aliphatic groups, cyclic groups, substituted cyclic groups, combinations of aliphatic groups and cyclic groups, combinations of substituted aliphatic groups and cyclic groups, combinations of aliphatic groups and substituted cyclic groups, combinations of substituted aliphatic groups and substituted cyclic groups, amido groups,

substituted amido groups, phosphido groups, substituted phosphido groups, alkyloxide groups, substituted alkyloxide groups, aryloxide groups, substituted aryloxide groups, organometallic groups, and substituted organometallic groups; and

wherein said organoaluminum compound has the following general formula:

$$Al(X^5)_n(X^6)_{3-n}$$

wherein (X^5) is a hydrocarbyl having from 1-20 carbon atoms;

wherein (X^6) is a halide, hydride, or alkoxide; and

wherein "n" is a number from 1 to 3 inclusive.

12. A process to produce a catalyst composition, said process comprising:

1) contacting said catalyst precursor of Claim 10 with at least one organometal compound selected from the group consisting of rac-dimethylsilybis(1-indenyl)zirconium dichloride, rac-1,2-ethanediylbis(1-indenyl)zirconium dichloride, rac-dimethylsilybis(2-methyl-1-indenyl)zirconium dichloride and at least one organoaluminum compound selected from the group consisting of triethylaluminum and tri-isobutylaluminum.

13. A process for producing a catalyst composition, said process comprising simultaneously contacting at least one treated solid oxide

compound, at least one organometal compound, at least one organoaluminum compound, and at least one alpha olefin;

wherein said treated solid oxide compound is produced by a process comprising: a) contacting at least one solid oxide compound with at least one electron-withdrawing anion source compound; b) optionally, also contacting said solid oxide compound with at least one metal salt compound; and c) calcining said solid oxide compound before, during, or after contacting said electron-withdrawing anion source compound or said metal salt compound to produce said treated solid oxide compound

wherein said organometal compound has the following general formula:

$$(X^1)(X^2)(X^3)(X^4)M^1$$

wherein M^1 is selected from the group consisting of titanium, zirconium, and hafnium;

wherein (X^1) and (X^2) are independently selected from the group consisting of cyclopentadienyls, indenyls, fluorenyls, substituted cyclopentadienyls, substituted indenyls, and substituted fluorenyls;

wherein substituents on said substituted cyclopentadienyls, substituted indenyls, and substituted fluorenyls of (X^1) and (X^2) are selected from the group consisting of aliphatic groups, cyclic groups, combinations of aliphatic and cyclic groups, silyl groups, alkyl halide groups, halides,

organometallic groups, phosphorus groups, nitrogen groups, silicon, phosphorus, boron, germanium, and hydrogen;

wherein at least one substituent on (X^1) and (X^2) is a bridging group which connects (X^1) and (X^2);

wherein (X^3) and (X^4) are independently selected from the group consisting of halides, aliphatic groups, substituted aliphatic groups, cyclic groups, substituted cyclic groups, combinations of aliphatic groups and cyclic groups, combinations of substituted aliphatic groups and cyclic groups, combinations of aliphatic groups and substituted cyclic groups, combinations of substituted aliphatic groups and substituted cyclic groups, amido groups, substituted amido groups, phosphido groups, substituted phosphido groups, alkyloxide groups, substituted alkyloxide groups, aryloxide groups, substituted aryloxide groups, organometallic groups, and substituted organometallic groups; and

wherein said organoaluminum compound has the following general formula:

$$\mathbf{Al(X^5)_n(X^6)_{3-n}}$$

wherein (X^5) is a hydrocarbyl having from 1-20 carbon atoms;

wherein (X^6) is a halide, hydride, or alkoxide; and

wherein "n" is a number from 1 to 3 inclusive.

14. A process for producing a catalyst composition, said process comprising simultaneously contacting a chlorided, zinc-containing

alumina, propylene, at least one organometal compound selected from the group consisting of rac-dimethylsilybis(1-indenyl)zirconium dichloride, rac-1,2-ethanediylbis(1-indenyl)zirconium dichloride, rac-dimethylsilybis(2-methyl-1-indenyl)zirconium dichloride, and at least one organoaluminum compound selected from the group consisting of triethylaluminum and tri-isobutylaluminum.

15. A catalyst composition produced by the process of Claim 11.

16. A catalyst composition produced by the process of claim 12.

17. A catalyst composition produced by the process of Claim 13.

18. A catalyst composition produced by the process of Claim 14.

19. A catalyst composition according to claim 15 wherein said catalyst composition has an activity greater than 500 grams of polypropylene per gram of treated solid oxide compound per hour under slurry polymerization conditions, using liquid propylene as a diluent, with a polymerization temperature of 70°C.

20. A catalyst composition according to claim 19 wherein said catalyst composition has an activity greater than 1000 grams of polypropylene per gram of treated solid oxide compound per hour under slurry polymerization

conditions, using liquid propylene as a diluent, with a polymerization temperature of 70°C.

21. A catalyst composition according to Claim 15 wherein a weight ratio of said organoaluminum compound to said treated solid oxide compound in said catalyst composition ranges from about 3:1 to about 1:100.

22. A catalyst composition according to Claim 21 wherein said weight ratio of said organoaluminum compound to said treated solid oxide compound in said catalyst composition ranges from 1:1 to 1:50.

23. A catalyst composition according to Claim 15 wherein a weight ratio of said treated solid oxide compound to said organometal compound in said catalyst composition ranges from about 1000:1 to about 10:1.

24. A catalyst composition according to Claim 23 wherein said weight ratio of said treated solid oxide compound to said organometal compound in said catalyst composition ranges from 250:1 to 20:1.

25. A catalyst composition according to claim 17 wherein said catalyst composition has an activity greater than 500 grams of polypropylene per gram of treated solid oxide compound per hour under slurry polymerization conditions, using liquid propylene as a diluent, with a polymerization temperature of 70°C.

26. A catalyst composition according to claim 25 wherein said catalyst composition has an activity greater than 1000 grams of polypropylene per gram of treated solid oxide compound per hour under slurry polymerization

conditions, using liquid propylene as a diluent, with a polymerization temperature of 70°C.

27. A catalyst composition according to Claim 17 wherein a weight ratio of said organoaluminum compound to said treated solid oxide compound in said catalyst composition ranges from about 3:1 to about 1:100.

28. A catalyst composition according to Claim 27 wherein said weight ratio of said organoaluminum compound to said treated solid oxide compound in said catalyst composition ranges from 1:1 to 1:50.

29. A catalyst composition according to Claim 17 wherein a weight ratio of said treated solid oxide compound to said organometal compound in said catalyst composition ranges from about 1000:1 to about 10:1.

30. A catalyst composition according to Claim 29 wherein said weight ratio of said treated solid oxide compound to said organometal compound in said catalyst composition ranges from 250:1 to 20:1.

31. A polymerization process comprising contacting said catalyst composition of Claim 15 and additional alpha olefin in a polymerization zone under polymerization conditions to produce a polymer.

32. A process according to Claim 31 wherein said additional alpha olefin is propylene.

33. A process according to Claim 31 wherein said additional alpha olefin is propylene and ethylene.

34. A process according to Claim 31 wherein said polymerization conditions comprise slurry polymerization conditions.

35. A process according to claim 34 wherein said contacting is conducted in a loop reaction zone.

36. A process according to claim 35 wherein said contacting is conducted in the presence of a diluent that comprises, in major part, propylene.

37. A polymerization process comprising contacting said catalyst composition of Claim 17 and additional alpha olefin in a polymerization zone under polymerization conditions to produce a polymer.

38. A process according to Claim 37 wherein said additional alpha olefin is propylene.

39. A process according to Claim 37 wherein said additional alpha olefin is propylene and ethylene.

40. A process according to Claim 37 wherein said polymerization conditions comprise slurry polymerization conditions.

41. A process according to claim 40 wherein said contacting is conducted in a loop reaction zone.

42. A process according to claim 41 wherein said contacting is conducted in the presence of a diluent that comprises, in major part, propylene.

43. A process to produce a polymer, said process comprising substantially simultaneously contacting at least one organometal compound, at least one organoaluminum compound, at least one treated solid oxide

compound, and at least one alpha olefin under polymerization conditions to produce said polymer;

wherein said organometal compound has the following general formula:

$$(X^1)(X^2)(X^3)(X^4)M^1$$

wherein M^1 is selected from the group consisting of titanium, zirconium, and hafnium;

wherein (X^1) and (X^2) are independently selected from the group consisting of cyclopentadienyls, indenyls, fluorenyls, substituted cyclopentadienyls, substituted indenyls, and substituted fluorenyls;

wherein substituents on said substituted cyclopentadienyls, substituted indenyls, and substituted fluorenyls of (X^1) and (X^2) are selected from the group consisting of aliphatic groups, cyclic groups, combinations of aliphatic and cyclic groups, silyl groups, alkyl halide groups, halides, organometallic groups, phosphorus groups, nitrogen groups, silicon, phosphorus, boron, germanium, and hydrogen;

wherein at least one substituent on (X^1) and (X^2) is a bridging group which connects (X^1) and (X^2);

wherein (X^3) and (X^4) are independently selected from the group consisting of halides, aliphatic groups, substituted aliphatic groups, cyclic groups, substituted cyclic groups, combinations of aliphatic groups and cyclic groups, combinations of substituted aliphatic groups and cyclic groups,

combinations of aliphatic groups and substituted cyclic groups, combinations of substituted aliphatic groups and substituted cyclic groups, amido groups, substituted amido groups, phosphido groups, substituted phosphido groups, alkyloxide groups, substituted alkyloxide groups, aryloxide groups, substituted aryloxide groups, organometallic groups, and substituted organometallic groups; and

wherein said organoaluminum compound has the following general formula:

$$Al(X^5)_n(X^6)_{3-n}$$

wherein (X^5) is a hydrocarbyl having from 1-20 carbon atoms;

wherein (X^6) is a halide, hydride, or alkoxide;

wherein "n" is a number from 1 to 3 inclusive; and

wherein said treated solid oxide compound is produced by a process comprising: a) contacting at least one solid oxide compound with at least one electron-withdrawing anion source compound; b) optionally, also contacting said solid oxide compound with at least one metal salt compound; and c) calcining said solid oxide compound before, during, or after contacting said electron-withdrawing anion source compound or said metal salt compound to produce said treated solid oxide compound.

44. A process according to Claim 43 wherein said at least one alpha olefin is propylene.

45. A process according to Claim 43 wherein said at least one alpha olefin is propylene and ethylene.

46. A polymer produced in accordance with the process of Claim 31.

47. A polymer produced in accordance with the process of Claim 35.

48. A polymer produced in accordance with the process of Claim 43.